Career Promotions for Technologists and Radiographers in Nuclear Medicine
Fairmont House, York – 14 July 2011

Practice Development & Educational Requirements in Hybrid Imaging

Marc Griffiths, Associate Head of Department,
Allied Health Professions, Faculty of Health & Life Sciences,
University of the West of England, Bristol

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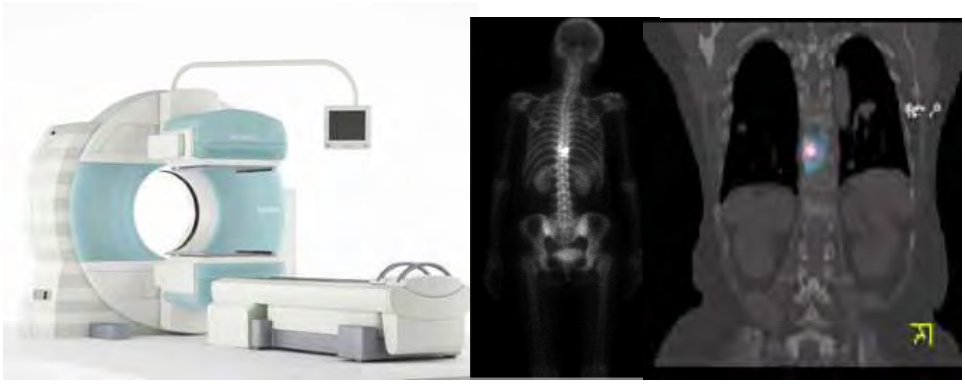
Overview

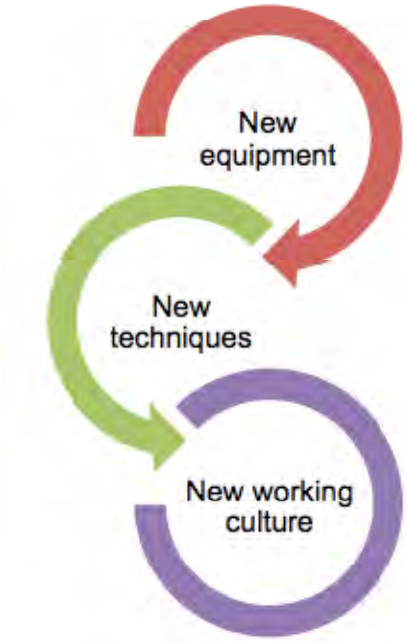
- Current technology position within nuclear medicine
- Emergence of a new culture and clinical skills
- Appropriate use of Computed Tomography (CT) within modern hybrid imaging practice
- Training & audit: Defining role development in hybrid imaging
- Challenges / opportunities
- Defining the educational requirements within hybrid imaging
- Future considerations

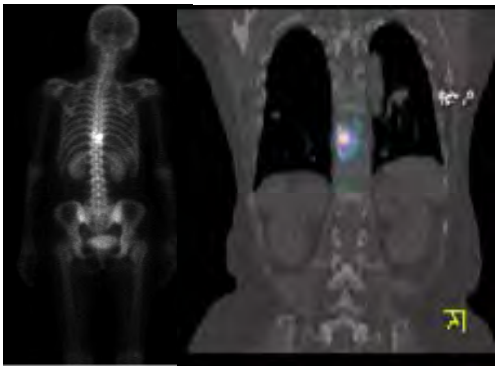
Technological advancements



Department of Health (2009) NHS 2010-2015: From Good to Great. Preventative, People Centred, Productive [online] available from http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_109876 [Accessed on 27/05/2011]

Hybrid Imaging: Transformational change

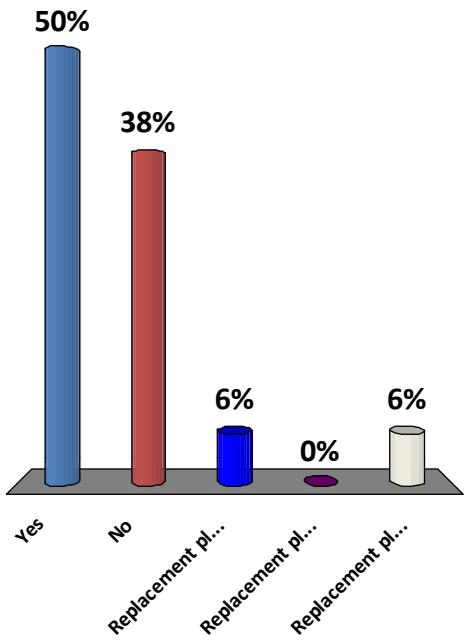




Lukas C., Holmes S., Cohen A., et al (2007) Transformational change in healthcare systems: an Organizational model*, Healthcare Management Review*, Oct-Dec, volume 32, 4, pp 309-20

Do you currently have a SPECT/CT System in your department?

1. Yes
2. No
3. Replacement planned for next 12 months
4. Replacement planned for next 2 years
5. Replacement planned sometime in the next 5 years



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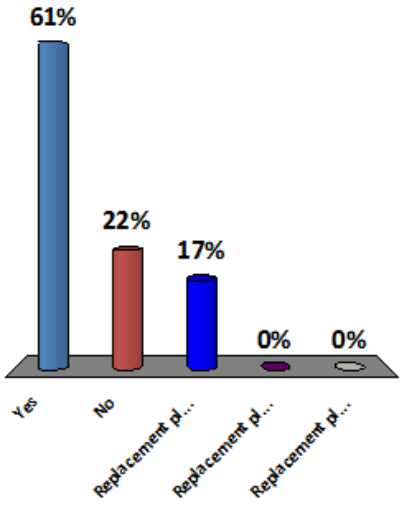
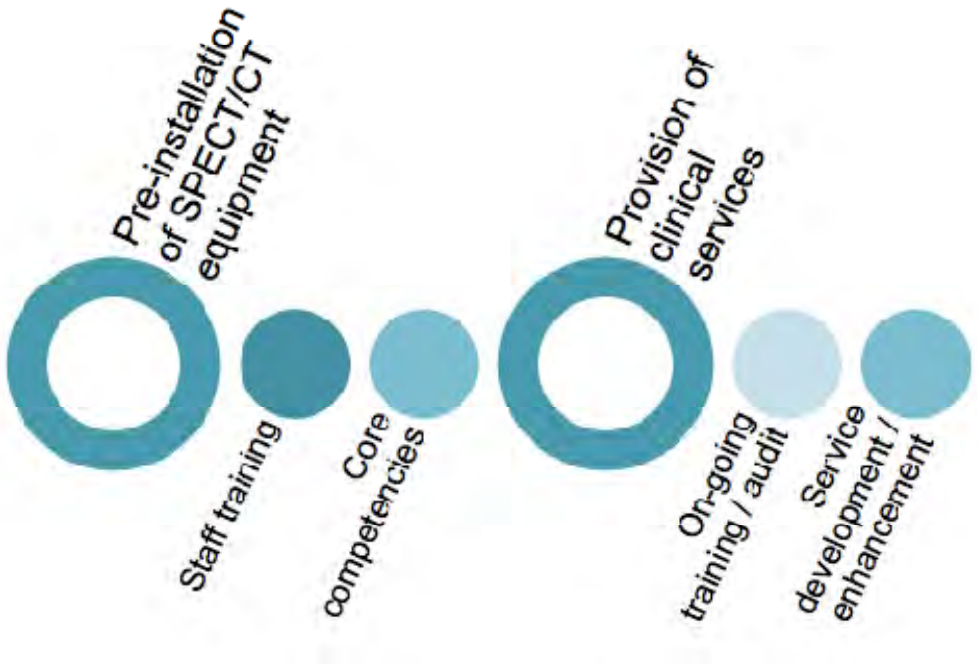


Source: BNMS Spring 2011 Meeting, Brighton

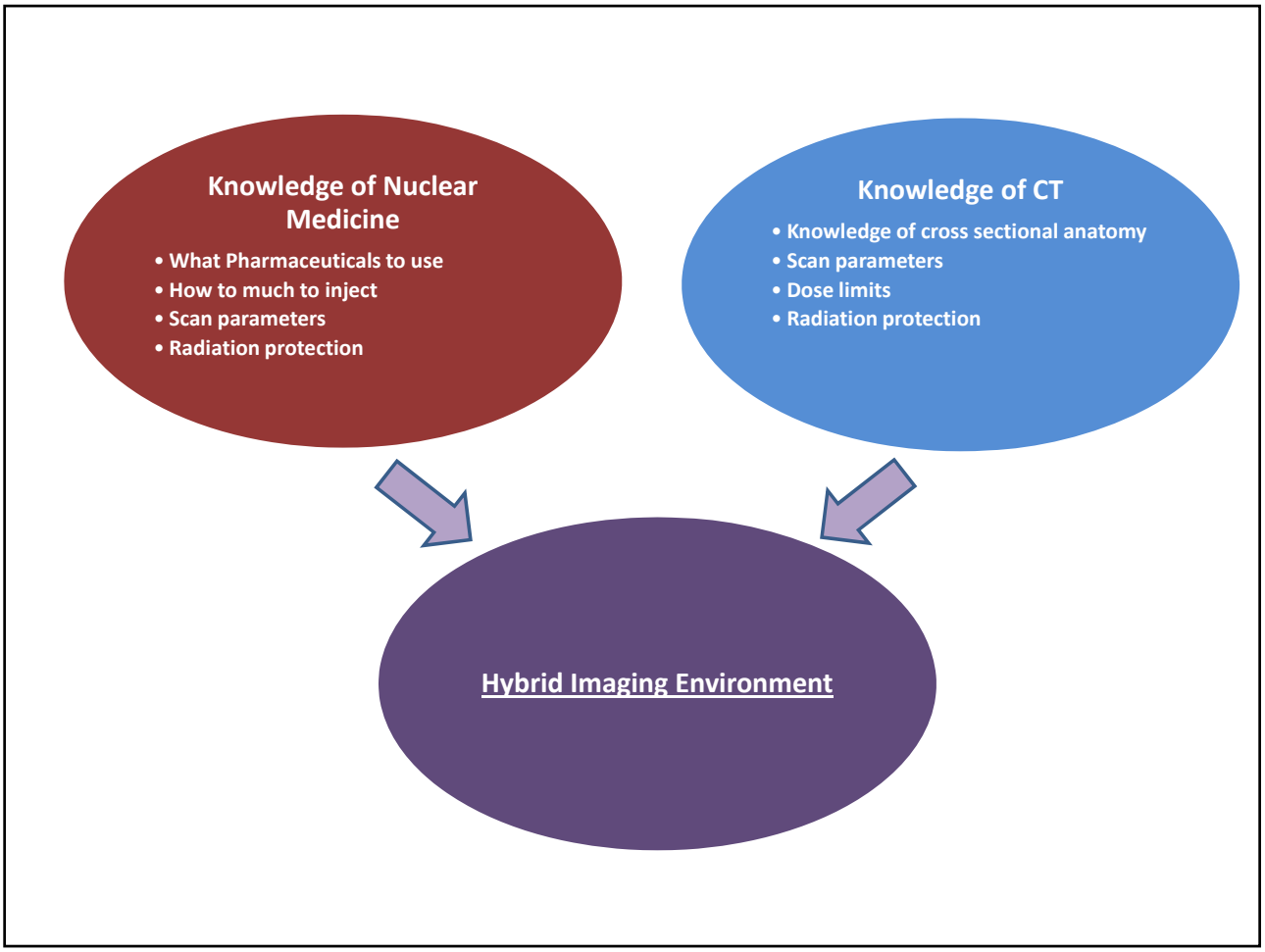
Mapping your journey



The emergence of a new workforce?

- New working practices – Inclusion of CT based imaging
- Complexity of software and "*movement*" of digital data
  ? Impact on patient contact
- Greater appreciation of the potential role of nuclear medicine within the patient treatment pathway

Hybrid Imaging Practitioner


Knowledge of Nuclear Medicine
• What Pharmaceuticals to use
• How to much to inject
• Scan parameters
• Radiation protection
Knowledge of CT
• Knowledge of cross sectional anatomy
• Scan parameters
• Dose limits
• Radiation protection
Hybrid Imaging Environment


Transformational Change # 1
Queen Alexandra Hospital, Portsmouth

Department profile

- Three system department:
  - Siemens Symbia T4 SPECT/CT
  - Siemens Symbia S SPECT
  - One retained SMV DSTLXi

Training & development

- CT Training of the Radiographers
  - Only one Radiographer had any previous CT experience
  - All would need CT training
  - Training initially performed by Applications Specialists
- Agency Radiographers also provided a good resource for training

Training and level of operation

- Mixture of radiographers and technologists within the nuclear medicine department
  - CT Training of the technologist ?
  - Defining "*appropriate training*" can be difficult
  - In house practical training
  - External theoretical training

Practice development

Protocols in SPECT/CT	• Appropriate use of CT • Value of AC & one stop shop imaging approaches
Quality control measures	• Optimising techniques • Dose considerations & QC checks
Knowledge & Skills development	• Knowledge and understanding • Radiation safety considerations

Considerations for role development

- Clinical SPECT/CT protocols:
  - Change of patient pathway
  - Diagnostic CT examinations
  - Potential use of contrast agents
- Training & audit:
  - CT acquisition protocols and processing parameters
  - Exam optimisation and dose minimisation
- Reporting:
  - NM Physician
  - Radiologist
  - Is there potential for Nuclear Medicine Practitioner reporting in Hybrid Imaging?

Transformational Change # 2

University Hospitals Bristol
NHS Foundation Trust

Two systems:

SPECT/CT – 16 slice
SMV DSTLXi

Background / training

- Previous CT experience prior to the introduction of a SPECT/CT system
- Business case for SPECT/CT system included:
  - Ability to perform stand-alone CT
  - Ability to perform contrast enhanced CT studies
  - Support Radiotherapy with post I-131 ablation examinations
- Necessity to “map” new patient workflows within the SPECT/CT environment
- Appropriate use of CT component
- Training of staff who had not used CT before
- Knowledge and skills development essential
- Departmental links with the local Oncology centre

Practice development

- Greater need for formal training and recognised qualifications to ensure the smooth running of the new service
- Extra training has been valuable:
  - Practitioners confidence to evaluate their own work with the new technology,
  - Gain an understanding of the various factors that can be manipulated in order to optimise image quality.
  - Improved working relationship with the CT department
  - Appreciation of dose implications from Multislice CT

Example of an emerging technique: Hybrid Imaging

- Introduction of new I-131 thyroid ablation scanning:
  - Integration of extra workload on a busy SPECT/CT system
  - Opportunity to develop working practices with the radiotherapy isotope team based at the oncology centre.
  - Improved understanding of other professional roles within the patient pathway and promote the changing capabilities of nuclear medicine and SPECT/CT
  - Improved job satisfaction

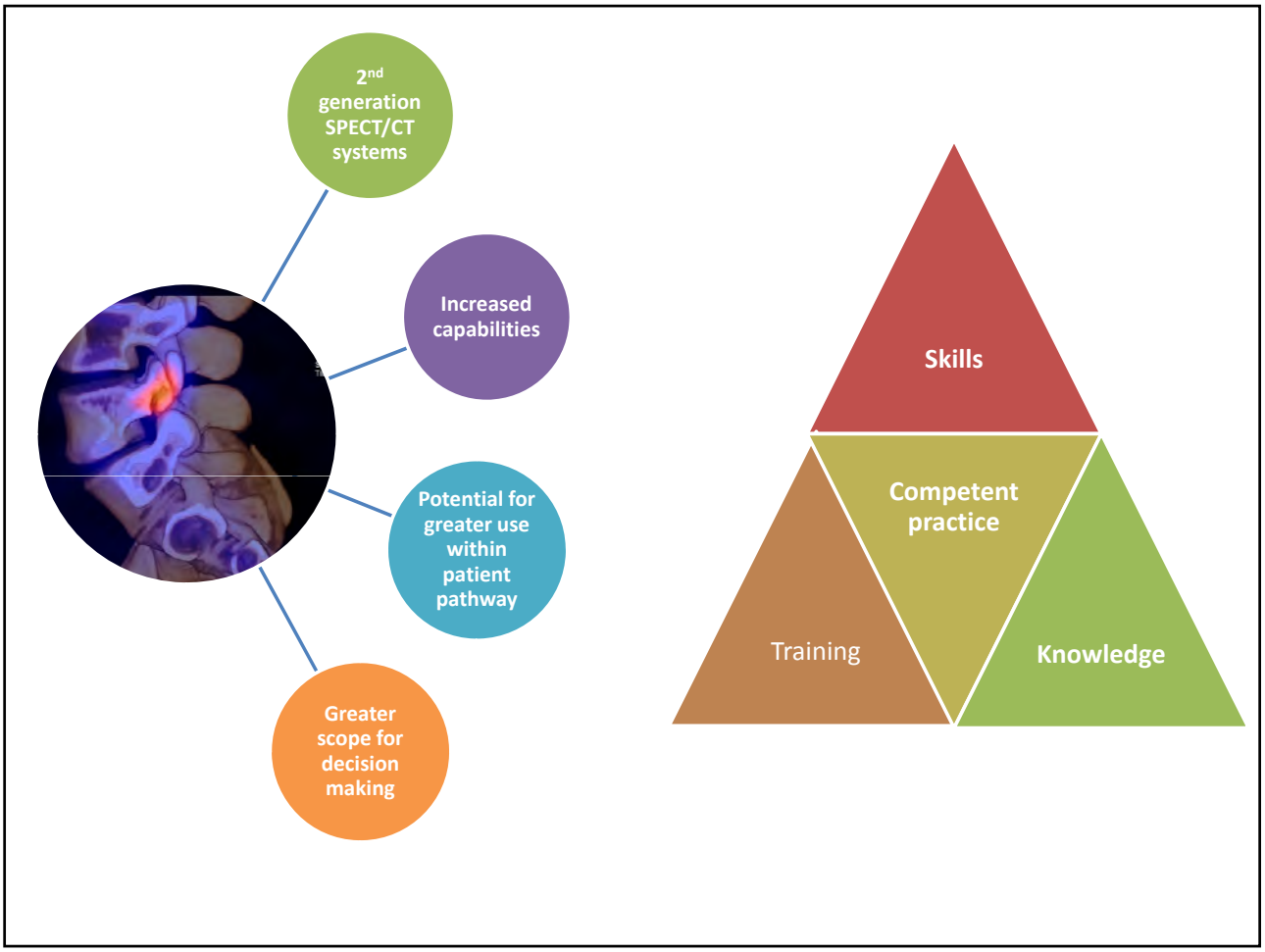
Role development

- SPECT/CT for oncology patients:
  - Increased confidence of utilising SPECT/CT as part of the patient pathway
  - Improved confidence demonstrated by HIPs in terms of:
    - Acquisition parameters
    - Cross sectional anatomy
    - Reconstruction factors
    - Display and image "blending" techniques
- Ability to offer Skeletal SPECT/CT as a "*one-stop shop*" approach

Meeting the needs of the workforce

- Training and education is essential
- SPECT/CT has impacted (+) greatly on our clinical service and on the skill development of the staff involved in running the service
- Several new services are now supplied by our department as a direct consequence of the new technology at our disposal
- Major changes in our working practices
  - Incorporation of “out of hours” CT lists on SPECT/CT system
  - Extra pressures on staff to provide CT examinations in normal working hours
  - Provision of a “*one-stop shop*” service for oncology patients: Improved patient experience and role development

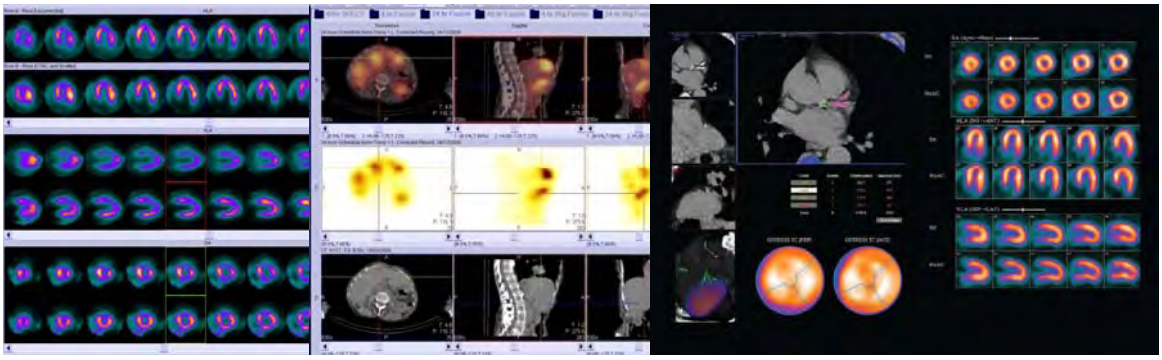
Appropriate use of CT within a hybrid imaging environment


2nd generation SPECT/CT systems
Increased capabilities
Potential for greater use within patient pathway
Greater scope for decision making
Skills
Competent practice
Training
Knowledge

Defining the use of CT in Hybrid Imaging

- Impact of hybrid imaging will be greater for SPECT/CT than PET/CT (Roach et al, 2006)
- Low dose CT can be performed to localise regional uptake areas identified on the NM scan
- Decisions need to be made with regards to the transmission (CT) dose levels used with the NM examination in SPECT/CT

Roach P., et al (2006) SPECT/CT imaging using a spiral CT scanner for anatomical localization: Impact on diagnostic accuracy and reporter confidence in clinical practice, *Nuclear Medicine Communications*, Vol 27, pp 977-987



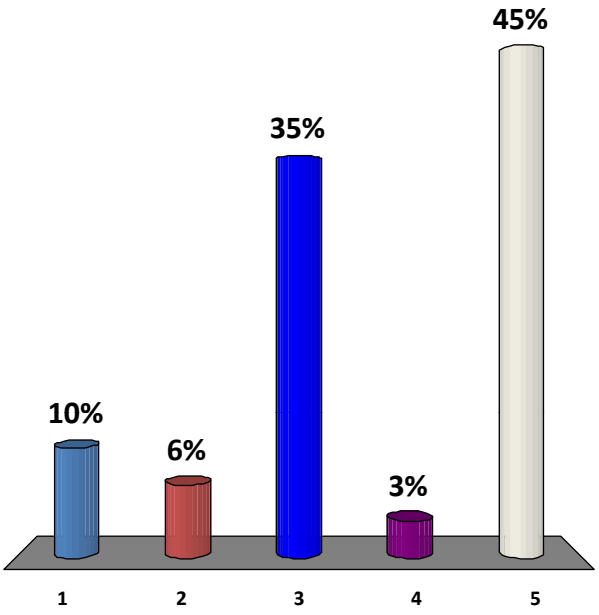
Standard Attenuation Correction

Localisation

Diagnostic provision / one stop service

What type of CT unit do you have within your SPECT/CT system?

1. Single Slice
2. Dual Slice
3. Multislice
4. Volume (Brightview)
5. N/A



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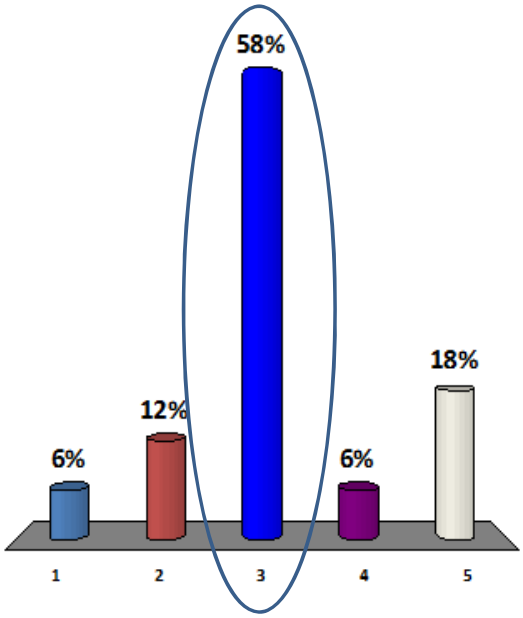
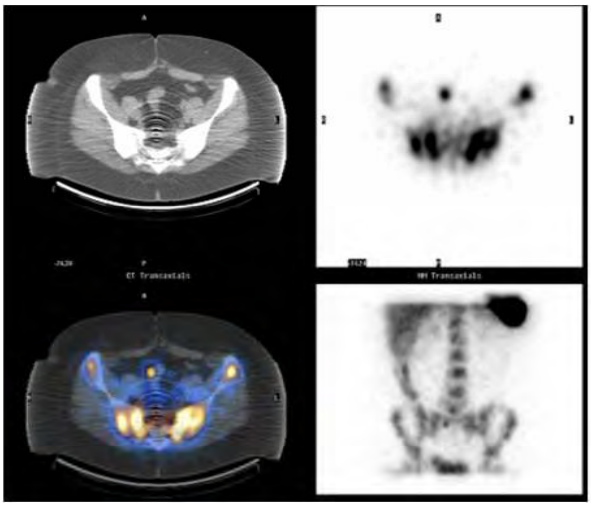


Source: BNMS Spring 2011 Meeting, Brighton

Training & audit

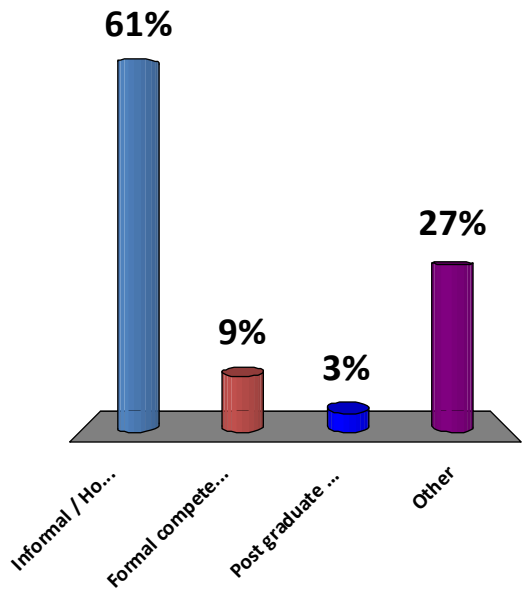
- Level of training should reflect the profile of your clinical department
- Assumptions of professional backgrounds should be treated with caution
- Training requirements should be factored into the business case for your new system
- Familiarisation with equipment & unexpected images necessary
- Audit system should be in place to monitor performance
- Regular Personal Development Reviews undertaken



Ring artefact on CT data set

What form of training have you / your staff undergone with regards to the use of CT?

1. Informal / House training
2. Formal competency based training
3. Post graduate education training
4. Other



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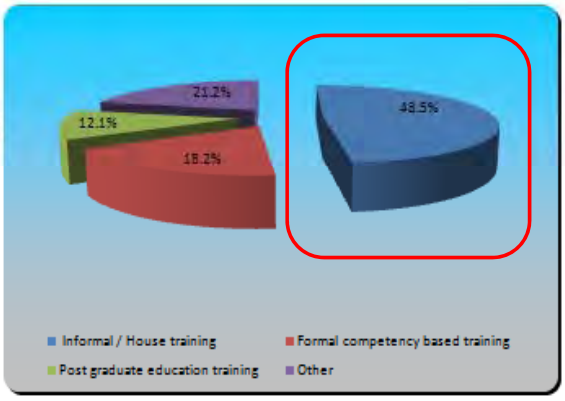


Source: BNMS Spring 2011 Meeting, Brighton

Compartmental model: Hybrid Imaging examinations

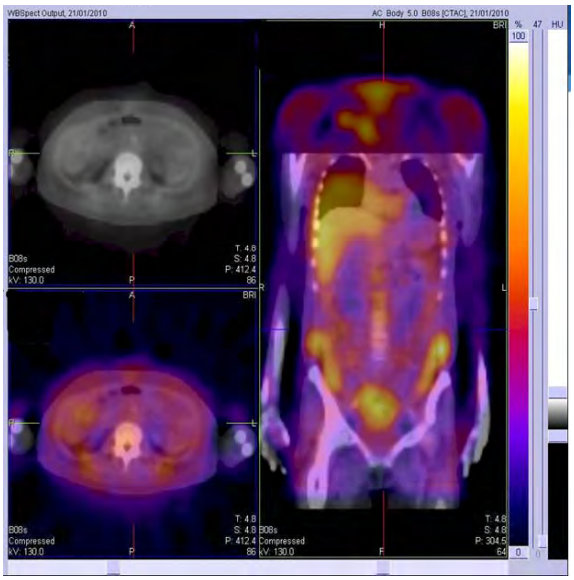
NHS Institute for Innovation and Improvement: Quality and Service Improvement Tools:

PDSA (Plan, Do, Study, Act)
SBAR (Situation, Background, Assessment, Recommendation)

http://www.institute.nhs.uk/option,com_quality_and_service_improvement_tools/Itemid,5015.html

Problem solving abilities

- Experiential learning approach
- Pattern recognition
  - Imaging with new isotopes
- Decision making capabilities
- Autonomous practice
- Critical evaluation of working practice



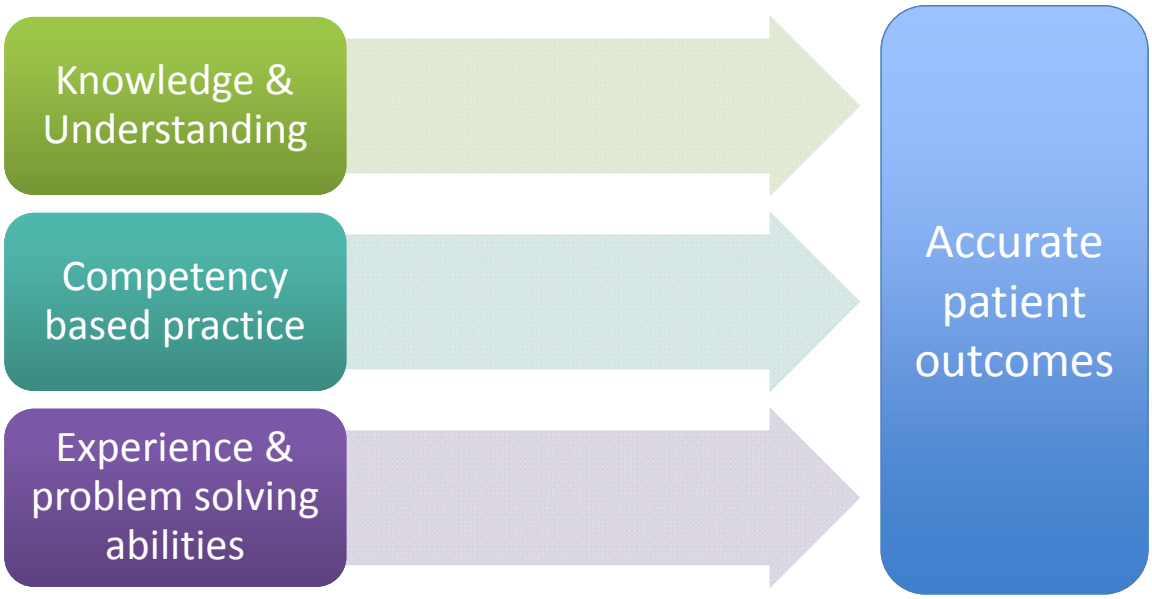
Mis-registration of SPECT and CT data sets

Knowledge of CT: Possible knowledge gaps

- Knowledge of cross sectional anatomy
- Scan parameters
- Dose limits & reduction techniques
- Radiation protection considerations
- Ability to detect artefacts / problem solve

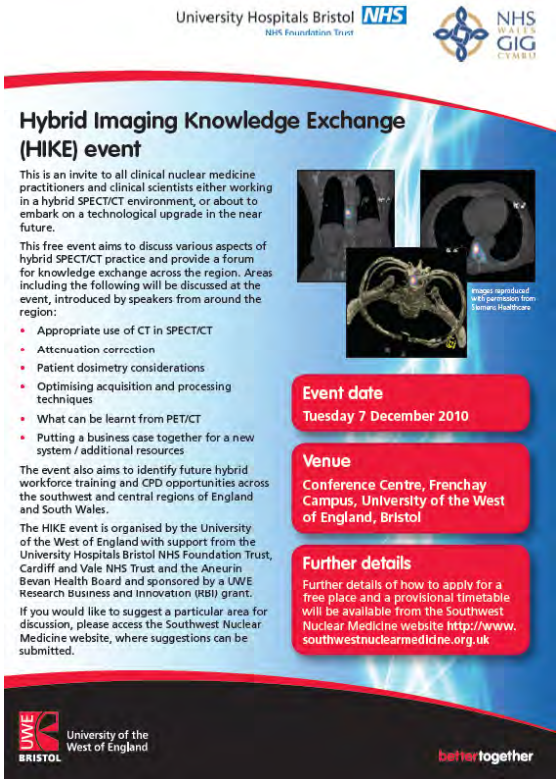
- Initial Hybrid SPECT/ CT systems provided AC / non-diagnostic images (localisation)
- Role of hybrid SPECT/CT systems has evolved
- Possible to undertake diagnostic CT on all modern SPECT/CT systems

Practitioner skills



Developing the evidence base: CT competencies

- HI Knowledge Exchange (HIKE) Event held at UWE, Bristol in December 2010
- Purpose of the event:
  - Evaluate current clinical practice
  - Debate departmental protocols & decision making skills relating to the optimal use of CT
  - Identify current "gaps" in knowledge / skills base
  - Identify possible future training requirements for all professional disciplines

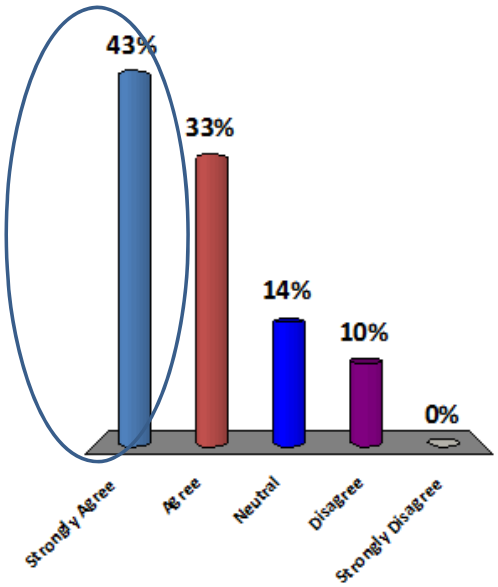


Main outcomes from HIKE

- Variation in SPECT/CT techniques evident
- A lack of understanding of imaging / processing parameters
- Uncertainty as to optimal clinical practice
- Default protocol driven rather than evidence based practice
- Lack of formal training opportunities
- Reliance on cascade training mechanisms
- Some departments relied solely on application training

SPECT/CT referrals have increased in my department

1. Strongly Agree
2. Agree
3. Neutral
4. Disagree
5. Strongly Disagree

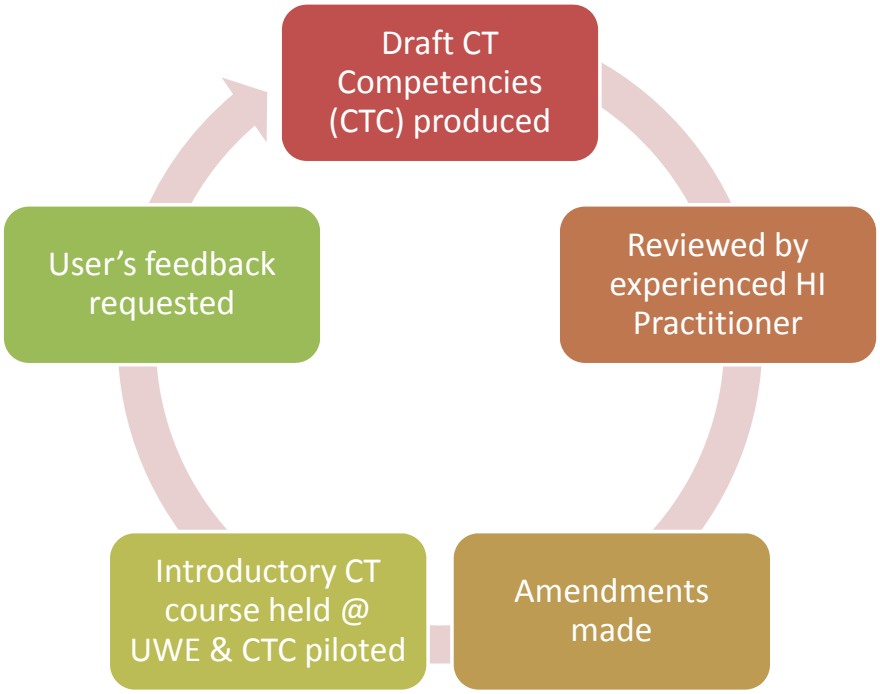


Source: Hybrid Imaging Knowledge Exchange Event, December 2010, Bristol

Actions resulting from from HIKE event

- Delegate reflections indicate clinical and professional value of formal hybrid imaging training
- Necessity to further develop professional relationships is essential for potential future clinical services
- The need to develop a CT competency framework
- Patient workflow mapping & new imaging techniques to be included in future curriculum

Development of CT competencies



Draft CT Competencies

BRISTOL

University of the West of England, Bristol

Faculty of Health and Life Sciences

Allied Health Professions

CT competencies for Nuclear Medicine Practitioners[1] working in a hybrid imaging environment

Version 1.2

Document owner: Marc Griffiths / University of the West of England, Bristol

Document date: 30th December 2010

[1] Nuclear Medicine Practitioners consist of Radiographers and Technologists

University of the West of England, Bristol

Quality Control Tests within a hybrid imaging environment

Depending on your area of clinical practice, performing specific CT quality control tests is an important aspect of daily / weekly imaging.

What is the daily CT QC in your hybrid imaging department?

The following images identify typical set ups for weekly CT QC in PET/CT and SPECT/CT:

Water phantom set up in PET/CT

Water phantom set up in SPECT/CT

How does this compare with the weekly CT setup in your hybrid imaging department?

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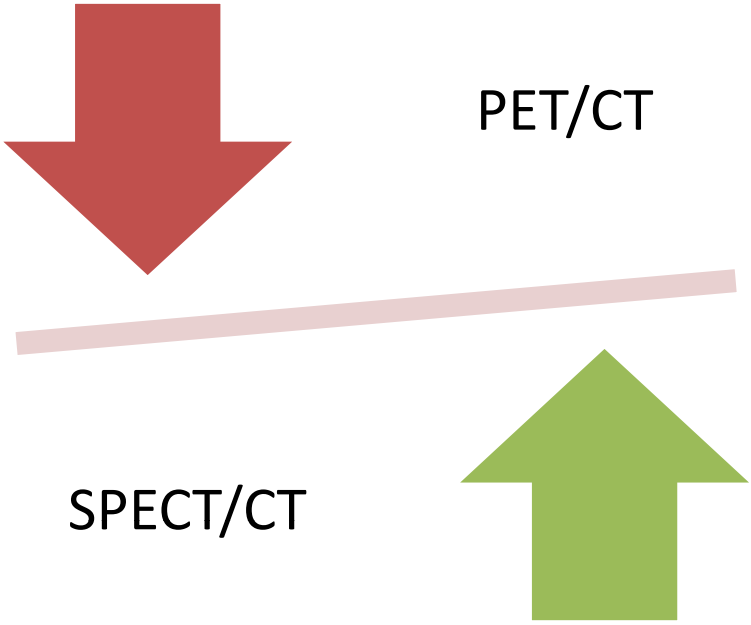
Future focus?



Emergence of new relationships, working cultures & service redesign

- Opportunity for greater presence within the established medical community
- Representation at MDT meetings: presenting findings & influencing treatment
- Research / audit active
- Service re-mapping / re-design
- Greater level of professional pride / respect

Challenges / opportunities

- Departments sharing experiences
- Willingness to work in a collaborative style
- Adding to the evidence base & undertaking funded research
- Greater presence of funded research roles within nuclear medicine
- Clear career trajectory for hybrid imaging workforce
- Unity and harmonisation within the modality

Reframing of established imaging techniques:
Patient Pathway Focussed (Chowdhury and Scarsbrook, 2008)

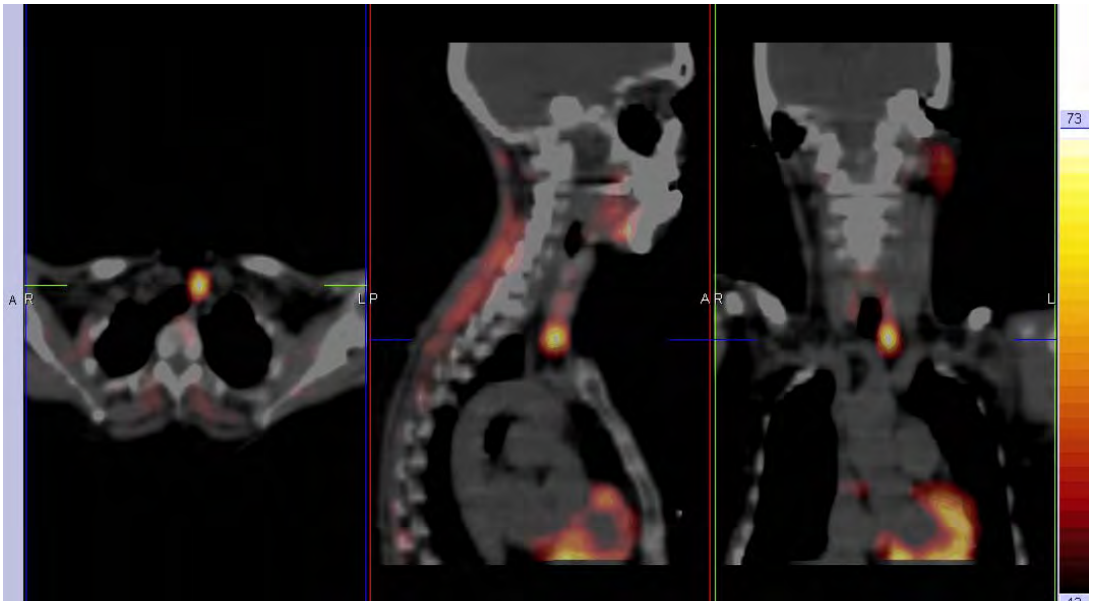
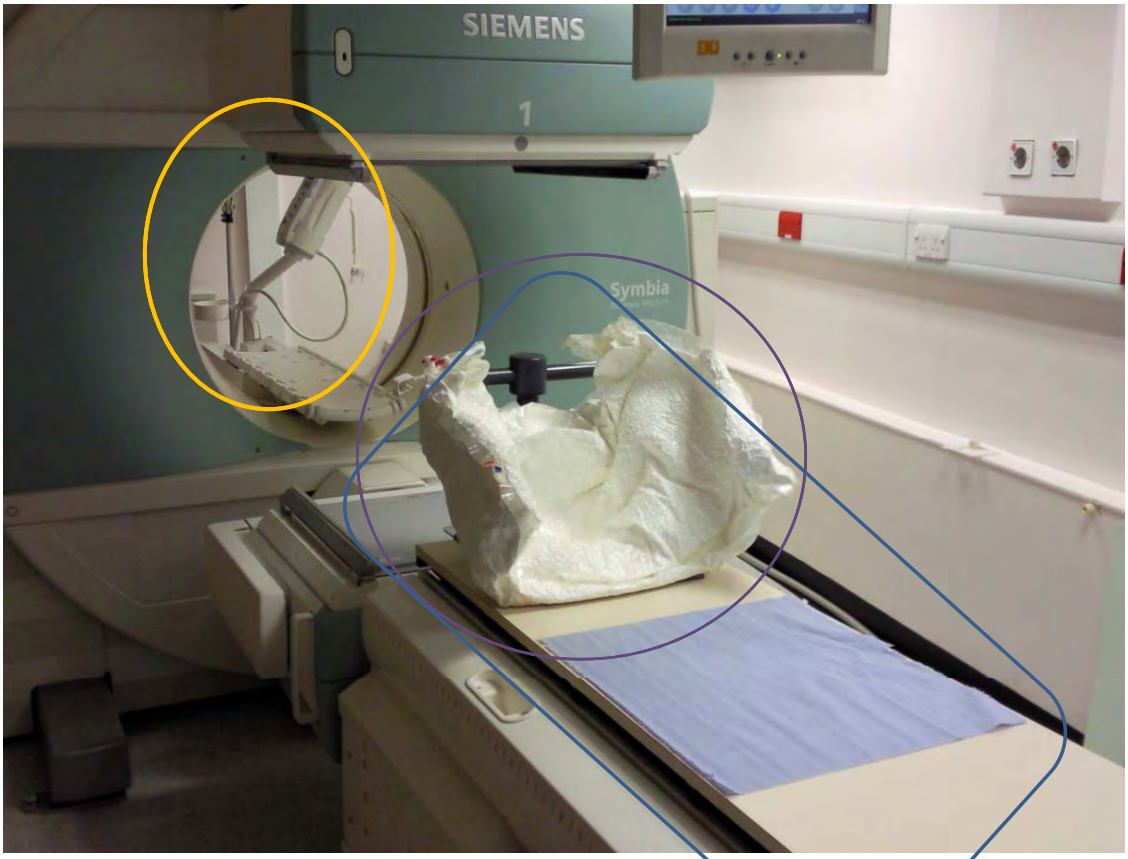


Image reproduced with permission from University Hospitals Bristol NHS Foundation Trust

Chowdhury F., Scarsbrook A., (2008) The role of hybrid SPECT/ CT in oncology: current and emerging clinical applications*, Clinical Radiology*, Volume 63, pp 241-251


SIEMENS
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Symbia


Complexity of future workload planning
Culture change and new roles
Existing & projected workflow
Staff training and skill development
Service redesign, research and audit
Patient Pathway management
New SPECT/CT system

Future considerations

- Greater level of CT within Nuclear Medicine training:
  - Cross sectional anatomy
  - Clinical applications & service optimisation
  - Physical principles / Safety considerations
  - Contrast agents
- Greater movement within multi-modality imaging
  - PET/MRI
  - Training programmes specifically for the hybrid imaging workforce
  - Research opportunities

MSc/Postgraduate Diploma/Postgraduate Certificate

Nuclear Medicine

In line with current advances in Nuclear Medicine Practice this programme is aimed at Technologists and Radiographers currently working within this clinical field, who plan to expand their existing knowledge base in such a way as to promote service delivery, enhance patient care and develop professional skills.

Delivered and co-ordinated by an experienced lecturing team with a proven track record in Nuclear Medicine education, this programme aims to provide insight into the current nuclear medicine environment, ensuring that learning is relevant to everyday practice and in-line with recent healthcare policy.

Modules dedicated to service enhancement, reporting skills and development into the 'Hybrid Imaging' environment provide students with the flexibility to tailor their individual learning needs to those of their clinical department.

This programme is offered via a "blended learning" approach, incorporating face-to-face, e-based and group based learning. A distance based model is also available, in order to support the national and international nuclear medicine workforce. Learning support mechanisms include BlackBoard and HERMES remote processing software, replicating clinical scenarios which facilitate models of enquiry based learning.

Providing Technologists and Radiographers with a clear career trajectory is central to the programme aim.

For further information on this exciting opportunity to further develop your knowledge and professional skills, please contact Marc Griffiths, e-mail marc.griffiths@uwe.ac.uk, telephone +44 (0) 117 32 88488.

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Nuclear Medicine Programme

Continuing Professional Development

Hybrid Imaging in Nuclear Medicine Module

This 20 credit Masters level module is delivered via a blended learning approach, encompassing a range of experienced clinical nuclear medicine practitioners, radiologists and academic staff.

Taught dates are supported via an on-line learning environment and enquiry based learning approaches. The module is aimed at nuclear medicine practitioners working within a hybrid imaging environment, or in a department about to undergo hardware changes in the near future. This module may also be suitable for diagnostic radiographers and radiotherapy radiographers who are developing their clinical roles.

The module syllabus covers:

- An understanding of SPECT/CT technology and current utilisation
- Principles of SPECT/CT imaging, techniques and the patient experience
- Patient preparation and dosimetry considerations for SPECT/CT hybrid investigations
- Interprofessional working within hybrid imaging and workforce development
- Appreciation of hybrid imaging parameters and fundamental processing considerations within SPECT/CT
- Fundamental overview of PET/CT
- Clinical value of attenuation correction
- Image registration considerations
- Professional guidelines and radiation protection
- Identification of potential imaging artefacts and problem solving

Course Dates

Available from October 2011

Venue

Glenside Campus, Bristol or via distance learning

Contact details

For further information and cost, please contact

Marc Griffiths
School of Health and Social Care
University of the West of England, Bristol
Glenside Campus
Blackberry Hill, Stapleton
Bristol BS16 1QY

E-mail marc.griffiths@uwe.ac.uk

Telephone +44 (0) 117 32 88488

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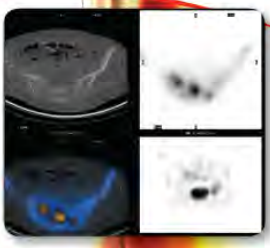
Reporting Skills and Service Enhancement in Nuclear Medicine

This 20 credit Masters Level module is aimed predominantly at Nuclear Medicine Practitioners who have a desire to develop their image interpretation skills, or in line with current clinical advancements, have the opportunity to engage with aspects of service development.

This distance based module which promotes investigational and enquiry based strategies is fully interactive and encourages the student to consider their own practice in relation to the developing field of Nuclear Medicine. The use of interactive workbooks and educational 'streamcasts' is further supplemented by discussion boards aimed at providing the student with a forum to question and develop their ideas.

The syllabus covers the ethical and legislative aspects of reporting and provides guidance on topics such as information governance, data protection and the technical reporting of core clinical examinations. These features are further supported by the testament accounts of Nuclear Medicine Practitioners who have been instrumental in the development of reporting services and who are fully aware of the current issues associated with service re-design and workforce development.

This module would suit a Nuclear Medicine Practitioner who is working towards an enhanced level of practice and who wishes to further develop their theoretical and clinical knowledge base. Importantly module content is flexible and can be tailored to meet the needs of your department.



Enrolement Details

This programme has a 'rolling' start date that can be accessed at any time in order to meet the needs of your department.

Module duration is usually nine months.

Contact details

For further information and cost, please contact

Gary Dawson
Faculty of Health and Life Sciences
University of the West of England, Bristol
Glenside Campus
Blackberry Hill, Stapleton
Bristol BS16 1DD

E-mail Gary2.Dawson@uwe.ac.uk

Telephone +44 (0) 117 32 88650

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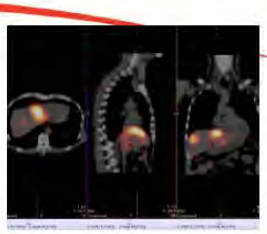
Essential Aspects of CT within Hybrid Imaging (SPECT/CT)

The course is aimed at:

Nuclear Medicine Technologists and Radiographers either currently working in a SPECT/CT environment, or who will be in the near future, post equipment installation.

Course Aims:

- Gain an appreciation of the current position of CT technology within modern SPECT/CT equipment
- Provide an understanding of optimal CT working practices within a SPECT/CT environment, including basic quality control tests
- Evaluate the range of CT imaging parameters within a SPECT/CT environment and justification for relevant clinical applications
- Explore the potential of CT imaging artefacts within a SPECT/CT environment
- Appreciate the potential imaging / processing pitfalls associated with SPECT/CT imaging
- Gain an understanding of the rationale for the use of CT within Nuclear Medicine environments, including current referral mechanisms
- Explore the emerging role of the practitioner within a SPECT/CT environment and safe working practices
- Understand the future potential value of CT in the diagnosis, planning and treatment of Oncology patients
- Provide a basic cross sectional CT overview of the chest, abdomen and pelvis, with correlation to typical SPECT radiopharmaceutical tracers (case studies)



Date: Tuesday 17th January 2012

Cost £144 including lunch & refreshments

Venue

Glenside Campus, Bristol

Further details

To book places please contact Emily Haycock in the CPD team

E-mail
HSC.studydays@uwe.ac.uk

Telephone
+44 (0)117 32 81161

http://cpd.hsc.uwe.ac.uk/1studydays.aspx

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